

MEMO

TO: Tom Fikslin

FROM: Ron MacGillivray

DATE: August 26, 2010

COPY: John Yagecic

SUBJECT: Criteria for Assessment of Hydraulic Fracturing Flowback Wastewater

A review of surface water quality criteria for probable components of Frac Flowback Water from drilling in Marcellus shale identified 14 parameters that do not have DRBC or EPA surface water quality criteria specifically for the parameter (strontium, bromide, lithium, sulfite, sulfide, titanium, molybdenum, tin, cobalt, ethylene glycol, sodium, calcium, and potassium). See worksheet labeled criteria in the accompanying Excel filename Well Monitoring Parameter Assessment.

Information is available for the development of DRBC water quality criteria for five of the parameters based on the following approaches. Four of the parameters (sulfite, sulfide, cobalt and ethylene glycol) have standards for surface water quality adopted by basin states that can initially be used as benchmark values for environmental safety and used for derivation of DRBC criteria if warranted. Molybdenum does not have a surface water quality standard adopted by a basin state but standards have recently been updated for molybdenum in Nevada that can be used as benchmark values and for development of DRBC criteria. Toxicity information is listed in IRIS for molybdenum.

Four of the parameters are ions (bromide, sodium, calcium and potassium) and information is not currently available to develop water quality criteria for these parameters. EPA-R3 staff has recommended monitoring drilling wastewater for major ions and evaluation of ion toxicity by the Freshwater Salinity/Toxicity Relationship Model. DRBC staff is familiar with this model and can use the model as an initial assessment tool.

Two of the parameters have radioactive components (strontium and thorium) which can be indirectly measured by radioactivity and compared to DRBC water quality standards for alpha and beta emitters.

Three of the parameters (lithium, titanium and tin) do not have standards or readily available benchmarks for environmental safety. Titanium and tin are not on the list of recommended parameters to monitor and no further ecotoxicology data is needed for those two parameters. If the DRBC plans to include lithium on the list of monitoring parameters, additional evaluation of ecotoxicity data, in consultation with the DRBC TAC, would be needed to predict an ecological effect concentration.